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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/583,599 | 05/31/2000 | Qing Min Wang | 99A209 | 4043 |

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EXAMINER

TRAN, THAO T

| ART UNIT | PAPER NUMBER |
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1711

DATE MAILED: 05/21/2003

17

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/583,599

Applicant(s)

WANG ET AL.

Examiner

Thao T. Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 January 2003 and 10 March 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8, 11, 16-25, 28, 33-46, 49, 50 and 54-64 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 11, 16-25, 28, 33-46, 49, 50 and 54-64 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 13 6) ☐ Other: _____

DETAILED ACTION

1. This is in response to the Amendments received on January 29, 2003 and March 10, 2003.
2. Claims 1-8, 11, 16-25, 28, 33-46, 49, and 54-64 are currently pending in this application. Claims 9-10, 12-15, 26-27, 29-32, 47-48, and 50-53 have been canceled.

Election/Restrictions

3. Upon further consideration, the requirement of election of species belonging to the polymeric leveler compounds, as set forth in the Office Action of January 10, 2003 has been withdrawn. All the chemical species in group (A) are being examined together.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-7, 21-24, 39-45, and 62 are rejected under 35 U.S.C. 102(b) as being anticipated by Yates et al. (US Pat. 5,863,410).

In regards to claims 1, 21, and 39, Yates teaches an acid copper electroplating composition, a method for making the same, and a method for copper plating using the electroplating composition, comprising: an aqueous solution of an acid, a copper salt, a carrier, a

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mercapto-containing organic brightener, and a leveler (see abstract; col. 5, ln. 1-3; col. 6, ln. 45-51; col. 8, ln. 21-28).

In regards to claims 2-4 and 40-42, Yates teaches that the acid is sulfuric acid and copper salt is copper sulfate (see col. 6, ln. 45-51).

In regards to claims 5-6, 22-23, and 43-44, Yates teaches that the carrier compound is polyethylene glycol and cellulose (see col. 6, ln. 45-51; col. 10, ln. 13-41).

In regards to claims 7, 24, and 45, Yates teaches that the mercapto-containing organic brightener is an ethanethiol (mercaptoethane sulfonic acid) (see col. 11, ln. 1-15).

In regards to claim 62, Yates teaches the additive compounds being added either individually or as combinations to the aqueous solution (see col. 6, ln. 45-51; col. 12, ln. 6-12).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 20, 38, 58-61, and 63-64 rejected under 35 U.S.C. 103(a) as being unpatentable over Yates as applied to claim 39 above.

Yates is as set forth in claims 1, 21, and 39 and incorporated herein.

In regards to claims 20, 38, and 58-61, although Yates does not specifically teach the weight ratios of the carrier, the leveler, or the brightener, it has been well within the skill in the art that specific ratios are relative dimensions that would have been adjusted through routine

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optimization, depending upon operating conditions and user's preference and intended use; and therefore would have little patentable weight. See *In re Rose*, 105 USPQ 237 (CCPA 1955).

In regards to claims 63-64, Yates further teaches the use of a direct current with a current density 20-100 amperes per decimeter square (see col. 19, ln. 48-50). Although Yates does not teach a current density between 3 mA/cm² and 40 mA/cm², it would have been obvious to one of ordinary skill in the art, at the time the invention was made, that concentration would have been determined by optimization through routine experimentation, depending upon user's preference and intended use, absence of evidence to the contrary. See *In re Aller*, 105 USPQ 233, 235 (CCPA 1955).

8. Claims 8, 11, 25, 28, 46, and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yates as applied to claims 1, 21, and 39 above, and further in view of Luxon (US Pat. 4,808,481).

Yates is as set forth in claims 1, 21, and 39 above and incorporated herein.

Yates differs from the present invention because the reference does not teach the use of a specific organic brightener or a polymeric leveler as presented in the claims.

Luxon teaches the addition of diethyldithiocarbamate and dimethylammonium chloride in the electrolyte composition (see col. 8, ln. 56-65; col. 29, ln. 15-16). Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to have added the leveler or the brightener molecules, as taught by Luxon, into the electrolyte composition of Yates, because Luxon teaches that diethyldithiocarbamate would enhance chelating while dimethylammonium chloride would enhance adsorption.

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9. Claims 16-17, 33-34, 37, and 54-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yates as applied to claims 1, 21 and 39 above, and further in view of DiFranco et al. (US Pat. 5,215,645).

Yates is as set forth in claims 1, 21, and 39 above and incorporated herein.

Yates differs from the present invention because the reference does not teach the use of a brightener/carrier molecule (claims 16, 33, and 54) that is a polymeric protein (claims 17, 34, and 55). Yates further teaches the use of an alkaline source (sodium salt) (see claim 6). However, the reference does not teach a chloride ion-containing compound (claim 37).

DiFranco teaches the use of gelatine components that are animal glue in a copper electrolyte bath; the gelatine components are high protein polymers (see abstract; col. 12, ln. 1-9). Although DiFranco does not call the gelatine components as brightener/carrier, the reference does disclose that the gelatine components are to increase brightness of the copper deposit (see col. 7, ln. 1-7). Hence, the gelatine components of DiFranco are inherently brightener/carrier, since they are also polymeric proteins that increase brightness of the copper deposit as claimed in the present invention.

DiFranco further teaches that the addition of the animal glue and chloride into the electrolytic bath would control roughness of copper deposit (see col. 6, ln. 55-58; col. 9, ln. 8-18). Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to have added animal glue and chloride, as taught by DiFranco, into the bath of Yates, for the purpose of decreasing roughness or dendrite formation of the copper deposit; and hence increasing brightness. Moreover, animal glue is relatively inexpensive, readily commercially available, and convenient to handle (see col. 12, ln. 6-9).

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10. Claims 18-19, 35-36, and 56-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yates as applied to claims 1, 21, and 39 above, and further in view of Dubois et al. (US Pat. 5,147,905).

Yates is as set forth in claims 1, 21, and 39 above and incorporated herein.

Yates does not teach the use of a specific carrier/leveler.

Dubois teaches the use of a carrier/leveler molecule such as melamine-formaldehyde (see col. 17, ln. 34-39). Although Dubois does not specifically teach the use of poly(melamine-co-formaldehyde), the use of melamine-formaldehyde would be equivalent to that of poly(melamine-co-formaldehyde). Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to have added melamine-formaldehyde, as taught by Dubois, into the electrolyte composition of Yates, because Dubois teaches that melamine-formaldehyde would enhance cross-linking and improve film properties, absence of evidence to the contrary.

Contact Information

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thao T. Tran whose telephone number is 703-306-5698. The examiner can normally be reached on Monday-Friday, from 8:30 a.m. - 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on 703-308-2462. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

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May 18, 2003

James J. Seidick
Supervisory Patent Examiner
Technology Center 1700